

REMARKS/ARGUMENTS

Reconsideration and withdrawal of the rejections of the application are respectfully requested in view of the remarks herewith, which place the application into condition for allowance.

I. STATUS OF THE CLAIMS AND FORMAL MATTERS

Claims 1, 2, and 5-19 are currently pending and are rejected in the Office Action mailed on January 27, 2010. Claim 1 is hereby amended. No new matter is added by this amendment.

II. RECORD OF TELEPHONE INTERVIEW

Applicants' attorneys would like to thank the Examiner for granting an After-Final telephone interview on April 22, 2010 with Applicants' representative F. Dour during which pending claim 1, the Final Office Action mailed on January 27, 2010, and the references cited therein, were discussed. In particular the Lombard reference was discussed. Amendatory language including separation of the abrasive from the boron source was discussed. The Examiner indicated that such language appeared to overcome the reference.

No agreement was reached.

III. REJECTIONS UNDER 35 U.S.C. § 102 and § 103

In the Office Action, claims 1, 2, 7, 14, 15, and 19 are rejected under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. Patent No. 2,356,938 to Lombard ("Lombard").

Claims 5, 6, 8, 9, and 16-18 are rejected under § 103(a) as allegedly unpatentable over Lombard.

Claims 1, 2, and 5-19 are rejected under § 103(a) as allegedly unpatentable over ZA 20017995 (“ZA ‘995”) in view of *Chemical Vapor Deposition of Boron and Boron Nitride from Decaborane* by Kim, et al. (“Kim”).

Claims 1, 2, 5-9, and 14-16 are rejected under § 103(a) as allegedly unpatentable over U.S. Patent No. 5,611,828 to Celikkaya (“Celikkaya”) in view of U.S. Patent No. 1,897,214 to Ridgway (“Ridgway”) and Kim.

Applicants respectfully traverse the rejections for at least the following reasons.

Amended independent claim 1 recites:

A process for producing a boron coated abrasive, the process including the steps of contacting the abrasive to be coated with **a boron source comprising boron powder combined with boric acid**, at a coating temperature of about 800°C to about 1200°C in an inert atmosphere, for a time sufficient to coat at least a portion of the abrasive, and **separating the abrasive coated with boron from the boron source**. (Emphasis added.)

As presently understood by the Applicants, Lombard discloses a vitrified diamond grinding wheel. *Lombard*, page 1, left column, lines 1-2. The referenced wheel comprises an abrasive portion including a mass of diamond particles held in a vitreous or ceramic bonding matrix. The abrasive portion of Lombard includes boron particles and a vitrifiable bond including a frit batch comprising boric acid. The vitrifiable bond with the boron particles forms the ceramic mix which is combined with diamonds to form an abrasive body. *Lombard*, entire text of page 2.

In rejecting claim 1, numbered section 3 on page 5 of the Office Action asserts that Lombard discloses, inter alia, mixing an abrasive with boron powder and boric acid at a coating temperature of 950°C in a nitrogen (i.e. inert) atmosphere for a time sufficient to coat the diamond, thus producing a coated grinding wheel.

Although Applicants maintain that a grinding wheel formed from a frit comprising boric acid and boron particles, mixed with diamond abrasive grains would be considered by one of ordinary skill in the art to be **a boron coated abrasive** as claimed, Applicant has amended claim 1 to further prosecution. Presently, process claim 1 includes the step of **separating the abrasive coated with boron from the boron source**.

Applicants respectfully submit that Lombard fails to disclose or render predictable separating the abrasive coated with boron from the boron source. Because the boron source in Lombard is the ceramic mix used to form the abrasive body of the grinding wheel, **separating the abrasive coated with boron from the boron source** would result in a failure of the grinding wheel. In Lombard, the non-abrasive center or backing of the grinding wheel differs from the abrasive periphery in that the center lacks the abrasive particles disclosed to be diamonds. *Lombard*, page 2, Therefore, **separating the abrasive coated with boron from the boron source** in Lombard would result in a non-abrasive wheel.

Accordingly, Lombard fails to teach **separating the abrasive coated with boron from the boron source** as required in the claims.

Applicant respectfully requests reconsideration and withdrawal of the rejections of the claims based on Lombard.

Numbered section 5, on page 8 of the Office Action, rejects claims 1, 2, and 5-19 as allegedly unpatentable over ZA '995 in view of Kim. Applicants respectfully disagree.

ZA '995 discloses a method of coating abrasive particles by first coating the particles with an organometallic coating and then pyrolyzing the coating to form the desired ceramic coating. The essential first step in ZA '995 is the coating of the abrasive with an organometallic coating. Although the step of providing the mixture can be accomplished in various ways as

indicated on pages 4-5 of the reference, in all cases the abrasive particles are first coated with an organometallic polymer or precursor.

Kim is concerned with the chemical vapor deposition of boron and boron nitride from a decaborane. As recited in the first column of page 2796, previously used source materials for the boron or boron nitride included boric acid or evaporated boron. Kim discloses that the choice of decaborane as a source material was to avoid the serious defects of prior known boron sources. Accordingly, Kim teaches away from using **a boron source comprising boron powder combined with boric acid** as claimed. There is no disclosure of using an organometallic coating found in the Kim reference.

The Office Action proffers no evidence or reason showing that an ordinarily skilled artisan would look to Kim, teaching away from an organometallic coating, to modify ZA '995 which requires such a coating.

Furthermore, neither reference suggests or renders predictable **separating the abrasive coated with boron from the boron source** as required by the presently amended claims.

Accordingly, for at least the above reasons, Applicant respectfully requests reconsideration and withdrawal of the rejections in this application based on ZA '995 and Kim.

In numbered section 6 on page 10, the Office Action rejects claims 1, 2, 5-9, and 14-16 as unpatentable over Celikkaya in view of Ridgway and Kim. Applicants respectfully traverse for at least the following reasons.

Celikkaya is directed to a method of producing alpha alumina-based abrasive particles having a metal boride coating. *Celikkaya*, column 2, lines 34-37. The Office Action concedes that Celikkaya fails to disclose boric acid in combination with boron powder. Instead, the Office

Action relies on Ridgway to disclose boric acid and boron oxide are known boron precursors.

Applicants respectfully disagree with the characterization of the disclosure in Ridgway.

Ridgway is directed to a method of making the abrasive boron carbide (*Ridgway*, page 1, lines 1-2) formed by reacting boron oxide with carbon. *Id.*, page 1, line 90. In an embodiment, boric acid may be heated to remove the water of crystallization to form anhydrous boron oxide, which is then mixed with carbon for further processing. *Id.*, page 1, line 80-page 2, line 5.

However, Ridgway is silent on the formation of a boron coating. The heating of boron oxide in the presence of carbon disclosed in the reference is to create boron carbide. According to Ridgway, the boron distills away from the source and condenses to form a crystalline product. There is nothing in the reference which discloses or renders predictable the condensation of boron vapor in layers on any substrate. Contrary to the assertion on page 4 of the Office Action, Ridgway fails to disclose “forming a boron coating on an abrasive substrate.”

Kim, as amply presented above, teaches away from boron sources such as boric acid and evaporated boron because of “serious defects” in the boron source, and instead directs one of skill in the art to decaborane as a source.

Furthermore, Celikkaya, Ridgway, and Kim, either alone or in combination, disclose **separating the abrasive coated with boron from the boron source** as required by the presently amended claims.

Accordingly, for at least the above reasons, Applicant respectfully requests reconsideration and withdrawal of the rejections in this application based on Celikkaya, Ridgway, and Kim.

For at least the foregoing reasons, it is believed that revised independent claim 1 patentably distinguishes over the relied upon portions of Lombard, ZA '995, Celikkaya, Ridgway and Kim, either alone or in combination, and is therefore allowable. Further, claims 2 and 5-19, which depend from claim 1, are allowable as well.

Statements appearing above with respect to the disclosures in the cited references represent the present opinions of the Applicants' undersigned attorney and, in the event that the Examiner disagrees with any such opinions, it is respectfully requested that the Examiner specifically indicate those portions of the respective reference providing the basis for a contrary view.

CONCLUSION

In view of the foregoing, it is believed that the present application is in condition for allowance. Accordingly, Applicants' attorneys respectfully request that a timely Notice of Allowance be issued in this case.

Please charge any fees incurred by reason of this response and not paid herewith to Deposit Account No. 50-0320.

Respectfully submitted,
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